
2005 Drought Response



Report to the Legislature



February 2006
Publication Number 06-11-001

Cover photo:

Lake Roosevelt (mouth of the Colville River) in Stevens County. *During normal flow, much of this land would be under water.*

Ecology photo taken April 25, 2005.



2005 Drought Response Report to the Legislature

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Water Resources Program**



In partnership with the:

**Washington State Department of Agriculture
Washington Department of Fish and Wildlife
Washington Department of Health
Washington Conservation Commission
Washington Department of Community, Trade and Economic
Development**



February 2006
Publication No. 06-11-001

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TABLE OF CONTENTS

Setting the Stage.....	iii
Background	1
Droughts: A natural part of climate cycle.....	1
2005 conditions emerged quickly	1
Response Framework in Place.....	4
Regulations	4
Planning	4
Water Supply Availability Committee.....	4
Executive Water Emergency Committee.....	5
Preparing for Drought.....	7
Drought foretold.....	7
Drought declared; State made ready	7
Drought funding.....	7
Municipal water supplies	8
Help for the Yakima Basin	8
Limited Effect on Energy Supplies.....	10
Aiding State Agriculture	12
Agricultural impacts.....	12
Disaster declarations	13
Assisting Columbia and Yakima basin farmers.....	13
Assisting Local Conservation Districts	14
Transportation Conserves.....	15
Meeting water needs while protecting landscape	15
Protecting Public Water Supplies.....	16
State health agency manages drinking water problems	16
Technical assistance and emergency response	16
Water rights and supply augmentation	17
Emergency drought funding	17
Safeguarding Fish and Stream Flows	18
Low stream levels threaten fish	18
Fisheries drought response team.....	18
Fish habitat accomplishments	19
Source exchanges.....	19
Pulse flows	20
Wildfire Prevention and Response.....	21
Wildfire prevention efforts	21
Wildfire numbers less than anticipated.....	22
Estimated costs.....	22
Getting the Word Out.....	23
Press releases	23
Fish & Wildlife outreach	24
Health assists small water systems	25
Agriculture information helps farmers.....	25

State partners with local governments and health departments	26
Budget & Expenditures	28
Past drought response money tapped	28
Lining up more response funds	28
Committed drought-related projects and activities	28
Expenditures	28
Recommendations	29
Reviewing drought declaration system	29
Improving water availability information	29
Changes to current water transaction program	30
Funding mechanism updates	31
Related considerations	31
Future Outlook and Preparation.....	33
Latest trend: Looking wet	33
Could see temperatures warmer-than-normal	33
Preparing for the future	34
Appendix A	35
Drought Capital Project Obligations.....	35
Appendix B	37
WDFW Expenditures & Projects.....	37
WDFW Closeout Report: Proposed Early Action Drought Projects	38
WDFW 2005 Drought Proposed Projects Budget Amendment	39
Appendix C	43
2005 Washington Mobilization Fires.....	43
Appendix D.....	45
Agency Contacts	45
Appendix E	47
Fish Protection Campaign.....	47

SETTING THE STAGE

Drought has always been a feature of Washington's climate. While it is generally viewed as a climate anomaly, in fact drought is the dry part of the normal climate cycle. What is unusual is that droughts appear to be occurring more frequently. The state experienced its second driest year on record in 2001 – and in every year since, the state has encountered at least one season with unusually dry weather conditions.

Water year 2005 (October 1, 2004, through September 30, 2005) came on the heels of a year where the mountain snowpack melted earlier than normal, followed by a warm and fairly dry summer. Water year 2005 got off to a good start. October precipitation ranged between normal to well-above normal for all but the north Puget Sound region. However, that situation abruptly changed from November 2004 through February 2005. Statewide precipitation was below-average except for the extreme northwestern tip of the Olympic Peninsula and the westernmost part of Whatcom County. With few exceptions, nearly the entire southern part of the state had well-below average precipitation.

To make matters worse, the fall and winter months were extremely warm, which dramatically affected the state's mountain snowpack. The snowpack was already below average when a warm mid-January storm, commonly referred to as a "pineapple express," removed much of the remaining snowpack. When February turned out to be both warm and dry, the die was cast for a potentially serious drought in 2005.

Unlike most states, Washington has a statutory definition of drought consisting of two parts:

- An area has to be experiencing, or projected to experience, a water supply that is below 75 percent of normal, and
- Water users within those areas will likely incur undue hardships as a result of the shortage.

By early March, projections were made that Washington might be facing not just another drought – but one as bad as or worse than the 1977 drought, the worst on state record. This situation led Governor Christine Gregoire to authorize the Department of Ecology (Ecology) to declare a statewide drought emergency on March 10, 2005. The declaration expired on December 31, 2005.

Washington has a specific plan for responding to drought conditions. The general process involves activating specific committees that:

- Monitor water supply conditions
- Make assessments about the likely impacts of a drought episode
- Develop programs for addressing the various, identified drought effects

This report will highlight some of the myriad of drought-response activities by Washington state agencies, examine lessons learned, and describe current water supply conditions. The primary agencies involved are:

- **Washington Department of Agriculture (WSDA)**
- **Washington Department of Community, Trade and Economic Development (CTED)**
- **Washington Department of Ecology (Ecology)**
- **Washington Department of Fish and Wildlife (WDFW)**
- **Washington Department of Health (DOH)**
- **Washington Conservation Commission (WCC)**



Surveying drought-related damage to a Yakima Valley orchard.
Photo by Kelly Wicker, WSDA

BACKGROUND

Droughts: A natural part of climate cycle

Even in the Evergreen State, droughts are a natural part of the climate cycle. In the last century there have been a number of drought episodes, including several that have lasted for more than a single season, such as the dry periods between 1928-32 and 1992-94. The most severe drought occurred in 1977 when many of the current records were set for low precipitation, snowpack, and stream flow totals. More recently, the 2001 drought turned out to be the second-worst in state-recorded history.

2005 conditions emerged quickly

Unlike other natural disasters, droughts normally occur slowly but last a long time. By most standards, the 2005 drought came on fairly rapidly. From December 2004 through February 2005, precipitation dropped to near record lows across Washington, between 51 and 76 percent of average. Eastern Washington received less than 10 percent of normal precipitation in February, and Western Washington didn't get much more. By March, mountain snowpack was only 26 percent of normal.

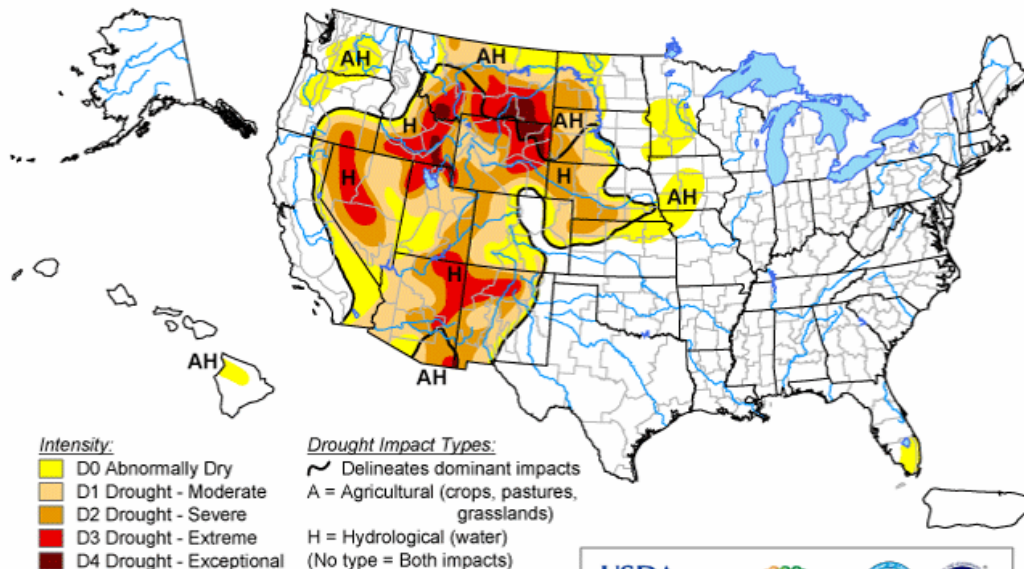
Droughts are often categorized by their likely impacts. The following National Drought Mitigation Center maps identify three categories:

- **Agricultural** — Crops that rely on natural precipitation are threatened
- **Hydrological** — Water supplies for irrigated agriculture and municipalities are threatened
- **Fire hazard** — Threat of wildfires from dry conditions is increased

The following maps show how quickly the state plunged into drought. As late as mid-January, most of Washington was largely unaffected. By March, moderate to severe drought conditions gripped the entire state.

U.S. Drought Monitor

January 4, 2005
Valid 7 a.m. EST



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

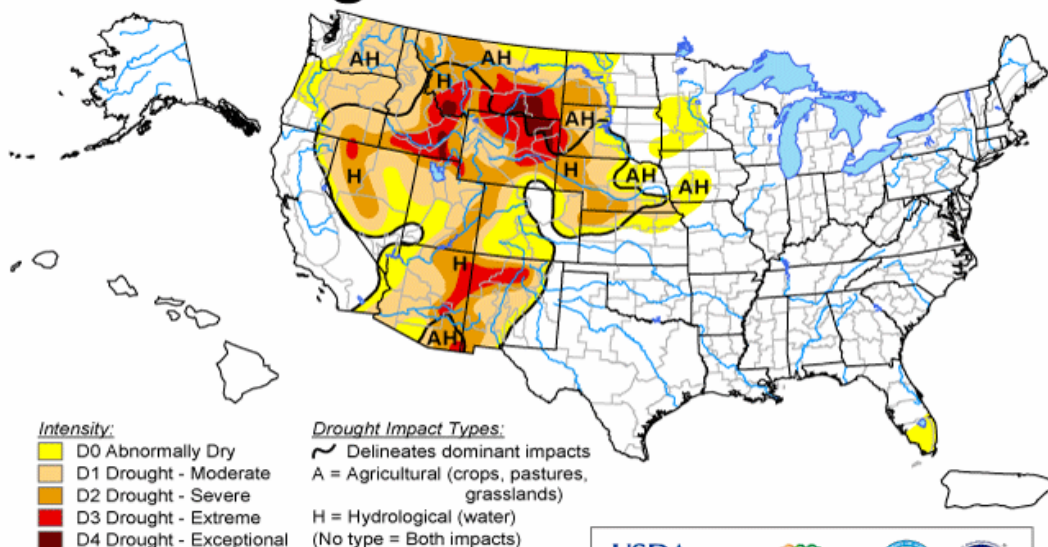
<http://drought.unl.edu/dm>



Released Thursday, January 6, 2005
Author: Mark Svoboda, NDMC

U.S. Drought Monitor

February 1, 2005
Valid 7 a.m. EST



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

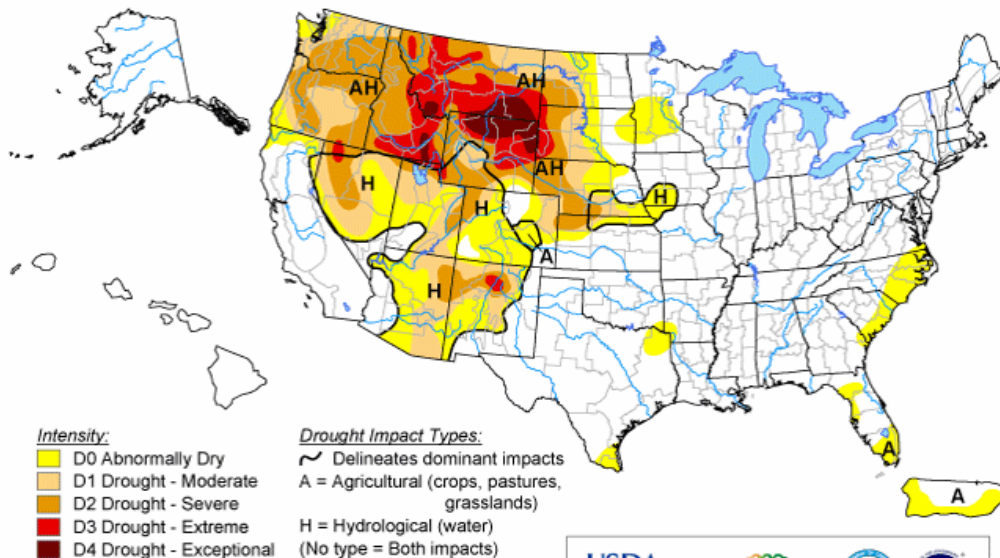
<http://drought.unl.edu/dm>



Released Thursday, February 3, 2005
Author: Brad Rippey, U.S. Department of Agriculture

U.S. Drought Monitor

March 8, 2005
Valid 7 a.m. EST



The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary



RESPONSE FRAMEWORK IN PLACE

Regulations

Under state regulations RCW 43.83B and Chapter 173-166 WAC, Ecology may declare a drought emergency if it determines that all or part of a geographical area is suffering from drought conditions. This is done upon the advice of the state Water Supply Availability Committee, with the concurrence of the state Executive Water Emergency Committee and the written approval of the Governor. The geographical area designated for drought funding must be specified.

Unlike most states, Washington has a statutory definition of drought, consisting of two conditions:

- An area has to be experiencing or projected to experience a water supply that is below 75 percent of normal, and
- Water users within those areas will likely incur undue hardships as a result of the shortage.

Planning

Washington has developed a comprehensive emergency management plan to respond to various types of emergencies. Ecology is the lead response agency for drought and has developed a comprehensive drought contingency program to respond to water shortages.

The Governor's Office, Ecology and the state departments of Agriculture; Fish and Wildlife; Health; Military; Natural Resources; Utilities and Transportation Commission; Community, Trade and Economic Development; the State Patrol; and the Washington Conservation Commission identified several primary areas on which to focus Washington's 2005 drought-response efforts:

- Maintaining critical energy supplies
- Aiding state agriculture
- Protecting public water supplies
- Safeguarding fish and stream flows
- Firefighting preparation

The Governor's Office created a specific action plan to respond to the water shortage. The plan created several committees to help oversee the response, outlined below:

Water Supply Availability Committee

Chaired by Ecology, the Water Supply Availability Committee consists primarily of representatives from federal agencies involved in monitoring, forecasting, or managing state water supplies. The committee conducts ongoing water supply monitoring and forecasting to identify possible drought conditions as early as possible. When they determined that water supplies across the entire state were at, or were projected to be, below 75 percent of normal the

state water supply committee advised the Executive Water Emergency Committee that one of the two statutory tests for a drought declaration had been met. The Water Supply Availability Committee has continued to monitor water supply conditions throughout 2005.

Water Supply Availability Committee membership – Comprised of representatives from:

- Department of Ecology (chair)
- U.S. Geological Survey
- National Weather Service
- Natural Resources Conservation Service
- U.S. Bureau of Reclamation
- U.S. Army Corps of Engineers, and
- Bonneville Power Administration.

Executive Water Emergency Committee

Chaired by the Governor's Office, the Executive Water Emergency Committee assessed the information provided by the Water Supply Availability Committee. The executive committee then recommended that Governor Gregoire approve Ecology's declaration of a statewide drought emergency. The Executive Water Emergency and Water Supply Availability committees met jointly throughout the spring, summer and fall to oversee state agency response to the drought and ensure the response was timely and appropriate.

Executive Water Emergency Committee membership – Comprised of representatives from:

- Governor's Office (chair) and state departments of:
- Agriculture
- Ecology
- Fish and Wildlife
- Health
- Military
- Community, Trade and Economic Development
- Natural Resources
- Washington State Patrol
- Washington Conservation Commission



Touchet River Cummins Road Bridge in Walla Walla County;
(4 cubic feet per second) on July 21, 2005.
Washington Department of Fish and Wildlife photo

PREPARING FOR DROUGHT

Drought foretold

From November 2004 through February 2005, Washington experienced one of the warmest, driest winters on record. Across the state, precipitation was at or near record lows, and by early March, the mountain snow pack averaged just 26 percent of normal. Many rivers and creeks on both sides of the Cascades were flowing at or near record-low levels.

Drought declared; State made ready

On March 10, 2005, Governor Christine Gregoire authorized Ecology to declare a statewide drought emergency. The state's two top drought committees continued to meet to integrate and coordinate the state's drought response.

Drought funding

Following the drought declaration, Governor Gregoire submitted a \$12 million supplemental budget request to the state legislature which lawmakers approved. This included:

- \$1.8 million that existed in the state's drought accounts
- \$8.2 million in additional capital funds to buy water, improve wells and implement other emergency water-supply projects
- \$2 million to hire temporary state staff to respond to the drought emergency, conduct public training workshops and undertake drought-related studies

Agencies receiving emergency drought funds included the departments of:

- Agriculture
- Ecology
- Fish and Wildlife
- Health
- Community, Trade and Economic Development

Ecology adopted an emergency rule to earmark distribution of the funding. As of December 31, 2005, the department's drought operating expenditures and obligations were approximately \$1.5 million and capital expenditures and obligations were about \$7 million. Additional detail regarding the capital budget is contained in **Appendix A**.

Grants and loans funded a variety of drought-related projects, such as acquiring water rights, modifying existing water sources, deepening wells, developing alternative or emergency water sources, making emergency connections to other public water supplies, installing new water pipelines and pumps, and detecting and repairing leaky delivery systems.

On May 4, Ecology initiated a voluntary online "water exchange" to help link those who needed water with water-right holders who had water to sell or lease. People could submit their information electronically through the Internet and the listing was updated weekly. By

November, 17 water-right holders posted that they had water to lease or purchase, while eight water users were seeking water rights. See information on the water exchange at www.WashingtonDrought.org.

Municipal water supplies

In March, both Seattle and Tacoma public utilities announced they had activated the advisory stage of their water-shortage contingency plans. City water managers worked to capture as much water from the spring rains as possible. Even without the normal mountain snow pack, the city of Seattle succeeded in refilling both the South Fork Tolt and the Chester Morse reservoirs, primary sources of water for the city.

By mid-May, some viewed the drought declaration skeptically when spring rains brought confusion regarding water scarcity. Despite the rains, major water providers in the Puget Sound area triggered management plans early to avoid possible water shortages in summer and fall due to the exceptionally dry winter and lack of adequate snow pack.

While Ecology's emergency drought funding program covered most financing needs, a variety of infrastructure financing programs were available for communities adversely affected by drought conditions:

- The Infrastructure Assistance Coordinating Council (IACC) provided financing and technical assistance with support from federal, state, local, and private infrastructure programs. To assist communities and persons with drought-related infrastructure needs, the IACC developed and distributed a marketing brochure about partner agencies that might provide assistance. Water purveyors found assistance on the IACC's Web site (<http://www.infracfunding.wa.gov/>) which featured a searchable database of funding programs.
- The Community Development Block Grant Program (CDBG) assists cities and counties to meet their short-term needs when an emergency occurs. The program is limited to those communities that meet size and income requirements. For permanent, longer term solutions, the program can assist eligible communities through their construction program. The block grant program is housed at the Department of Community, Trade and Economic Development (CTED). There were no funding requests this past year related to the drought.
- The Public Works Trust Fund (PWTF) offers an emergency loan program, and can provide low-interest loans (currently 3 percent) for construction of new or rehabilitation of existing public water systems. Loans are available to cities, counties, special purpose districts and quasi-municipal forms of local government, with the exception of school and port districts. The Washington Public Works Board, with staffing support from CTED, guides the program. There were no funding requests this past year related to the drought.

Help for the Yakima Basin

The driest area in the state was the Yakima River basin, which needed twice the normal level of precipitation between late March and June just to near 75 percent of regular water supply. In

March, water-supply forecasters predicted the 2005 summer irrigation supply would be just 34 percent of normal for Yakima basin project irrigators with junior water rights. In addition, 134 domestic and municipal water users with water rights junior to the Yakima River Irrigation Project faced curtailment. By August, the U.S. Bureau of Reclamation (USBR) reported that junior water right holders received 42 percent of normal supply.

Ecology initiated discussions with USBR and the Yakama Nation to refine the 2001 drought response. It was expected that Yakima Valley water users would respond to the forecast of 34 percent pro-rationing in much the same way they did during the 2001 drought emergency. Some would seek water transfers, primarily between Sunnyside Valley Irrigation District and Roza Irrigation District (Roza); emergency supplemental wells within the Roza and the Kittitas Reclamation districts; and water right leases on key upper-valley tributary streams to improve fish habitat.

With a drought declaration imminent, on March 7, 2005, Ecology mailed a letter inviting all pre-1905 water right holders in the Yakima basin above Parker to submit lease offers for the 2005 irrigation season. Ecology received a total of 31 water right lease offers and initially negotiated three leases, and later two more. Ecology leased a total of 4,012 acre-feet of water. Of that, approximately 1,575 acre-feet was the consumptive use under the leased rights available to offset or mitigate out-of-stream uses. The Yakima County Superior Court (Court), which has legal jurisdiction over surface-water rights in the basin, approved the water right transfers by the end of April.

The Water Transfer Working Group (WTWG) is comprised of representatives from the state departments of Ecology and Fish & Wildlife, USBR, the Yakama Nation, and Yakima Valley water users. To respond to the drought, WTWG met weekly instead of monthly, and the Court agreed to hold a second oversight hearing each month to facilitate timely approval of emergency transfers.

On April 7, 2005, USBR imposed pro-rationing among its contract holders. This triggered curtailment of all post-1905 surface water users in the Yakima basin, based on the Court's March, 11, 2005, order. Ecology used a 60 acre-foot portion of one of its five leases to offset the domestic use of junior water-right-holders and improve stream flows affected by the drought. This action mitigated the water use of six youth camps and 126 other public and private water systems serving recreational homes and permanent residences.

The city of Roslyn, one of the 134 water users dependent on post-1905 water rights, secured a temporary water-right transfer of 220 acre-feet from Suncadia Resort to offset its consumptive use during the 2005 irrigation season.

Ecology also provided a \$10,000 local contract to conduct free seminars in Okanogan, Cashmere, Prosser and Buena for basin farmers regarding managing tree-fruit crops and grapes under drought conditions.

LIMITED EFFECT ON ENERGY SUPPLIES

Snowpack and water supply effects on Washington power supplies generally occur in the winter. Snow melt is captured throughout the spring and summer behind hydroelectric dams for release and generation during the peak demand winter period.

Department of Community, Trade and Economic Development (CTED) officials were concerned that the early mountain snowpack melt might mean that state water supplies would not be enough to meet typical energy demands. From January to March the forecasts were getting worse and worse, down to 66 percent of normal in March – a portend of an extremely poor water year and a possible reduction in electricity production. As it turned out, the forecast improved in April, and continued to do so. By late spring the state was no longer worried about the energy impacts of drought.

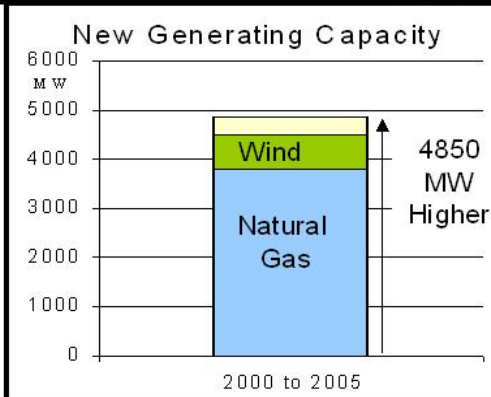
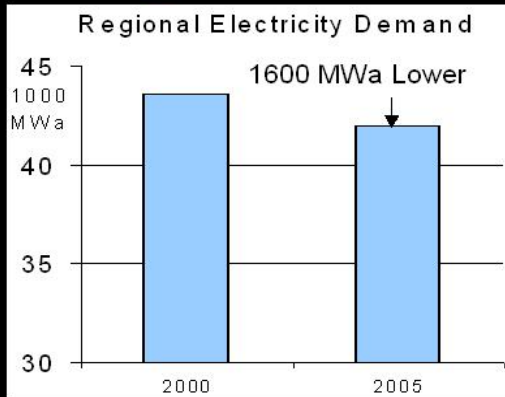
The following table illustrates how the Columbia River flow in 2005 related to the 20-year average flow. Normal river flow in the Columbia River at The Dalles from January through July is 105 million acre feet (MAF) of water. The final river flow was 81.3 MAF, about 76 percent of normal. Sufficient water was captured to fill reservoirs to about 95 percent of capacity, more than enough for projected winter electricity demands. The Northwest Power and Conservation Council projected a less than one percent loss-of-load probability for winter 2005-06 so therefore, no blackouts were anticipated due to low water supplies.

Columbia River flows, January through July, at The Dalles in million acre feet (MAF)

	Jan.	Feb.	Mar.	April	May	June	July
20 Year Average Cumulative							105
2005 Monthly	7.174	5.594	6.049	10.565	21.608	18.798	11.615
2005 Cumulative	7.174	12.714	18.763	29.328	50.936	69.734	81.349
Forecast % of Normal	80%	77%	66%	69%	70%	74%	76%

A few other items also helped Washington avoid problems. Unlike the 2001 drought emergency, California did not have supply problems putting a drain on Washington generators. Energy demand in the Pacific Northwest has decreased significantly since 2001, due in part to the closure of aluminum plants, and that load has not returned. Also, between 2001 and 2005, the region added significant amounts of non-hydropower generation. The decrease in demand, the increase in generating capacity, and the larger river flow meant the 2005 drought had little effect on Washington's energy supply.

Why We Do Not Have an Energy Crisis

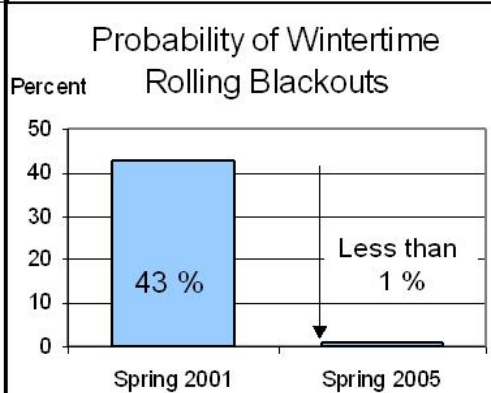
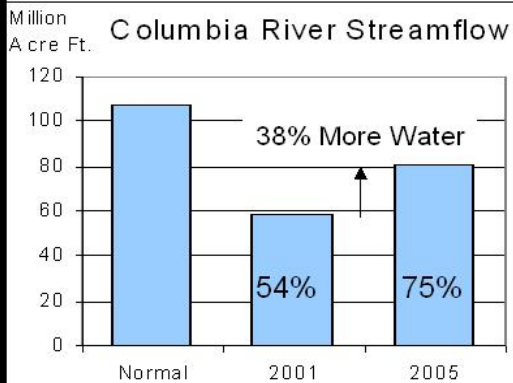


Demand:
Northwest
Power Pool
Jan - Mar

Capacity:
Northwest
Power &
Conservation
Council

Stream flow:
National
Weather
Service.
Jan - July
at The Dalles

Probability of
Loss of Load:
Northwest
Power &
Conservation
Council



AIDING STATE AGRICULTURE

Agriculture is the industry most heavily affected by drought. The state's food and agriculture industry support more than 180,000 jobs around the state and generates 13 percent of the state economy. Almost 70 percent of Washington's crop value (\$3.6 billion) comes from the 27 percent of harvested cropland that is irrigated. This includes the most valuable crops: apples, cherries, other tree fruit, vegetables, onions and potatoes. Per acre, irrigated crops are worth almost seven times more than crops from non-irrigated land. In Washington, the tree fruit industry is the largest single user of irrigation water.

The Washington Department of Agriculture (WSDA) has the primary role to coordinate federal, state and local drought relief for the agricultural community. Once the 2005 drought was declared, WSDA assembled a Drought Response Action Team, consisting of more than 30 agricultural organizations.

The team met regularly with irrigators, key agribusiness representatives, U.S. Department of Agriculture (USDA), and other federal and state agency officials. Short- and long-term drought-related problems were discussed and recommendations were developed. Primary duties included:

- Monitoring water supplies across the state.
- Securing additional federal funding for affected areas.
- Providing technical assistance and funding to conservation districts across the state.

In March, WSDA made a preliminary estimate of the potential impact of the drought on Washington's agriculture industry. Assuming a worst-case scenario of below-average precipitation throughout the growing season, the state anticipated that crop losses would be between \$195 and \$299 million, or 5 to 8 percent of the total Washington harvest. These effects were anticipated to mostly affect the irrigated Yakima River basin and dryland wheat.



Ecology photo

Agricultural impacts

Despite potential drought impacts of up to \$300 million, unexpected spring rains combined with reallocation of water and conservation measures by farmers largely mitigated the drought's impacts. Harvest of most crops was near normal levels. Some crops were actually damaged by rain that prevented harvest of hay and limited field work, and by cool spring weather that resulted in poor pollination of some fruit crops. Winter wheat harvest was near normal statewide

but spring wheat harvest was down largely due to reduced planting in anticipation of the drought. While statewide harvests were near normal, local farmers who did not receive the spotty rains suffered poor harvests.

Disaster declarations

A number of farmers experienced drought-related crop damage. In October, Governor Gregoire requested that USDA Secretary Michael Johanns declare Disaster Designations as a result of significant crop damage from drought. The following counties were included: Asotin, Benton, Chelan, Clark, Columbia, Cowlitz, Douglas, Franklin, Kittitas, Klickitat, Lincoln, Skamania, Walla Walla, Wahkiakum and Yakima. The USDA Farm Service Agency and WSDA prepared reports to support these requests.

The drought disaster declaration, if approved, provides low-interest Farm Service Agency loans from the federal Small Business Administration to cover production and farm property losses to farmers in the affected counties. In addition, the U.S. Small Business Administration declares an associated economic injury disaster to provide low interest loans to other businesses affected by the crop losses.

Assisting Columbia and Yakima basin farmers

Stream flows on the Columbia River Main-stem were sufficient so that no regulation (stoppage) of water diversions was required under WAC 173-563-056. In contrast, despite Ecology choosing to implement a reduced minimum stream flow level, approximately 330 farmers in the basin had to curtail water use for a portion of the 2001 drought emergency.

The Yakima River Basin is one of the state's most productive agricultural areas. Most Yakima basin irrigators get their water through the U.S. Bureau of Reclamation's Yakima Project. Reclamation maintains five storage reservoirs that provide water for several area irrigation districts once natural stream flow levels drop or surrounding mountain snowpack melts.

In past droughts, Ecology authorized Yakima Basin irrigators to use deep wells for emergency supplies. However, hydrogeologic understanding of the basin has increased, making it clear that deep wells eventually affect stream flows in the Yakima River basin. Ecology authorized some emergency wells and contributed \$1 million toward mitigation costs to offset the long-term effects on the Yakima River from using the emergency wells.

The Roza and Kittitas irrigation districts expected to receive only one-third of their regular water allocation due to the drought. The Yakima County Superior Court approved 27,701 acre-feet of emergency lease water for Roza and 1,200 acre-feet for the Kittitas Reclamation District.

The Department of Ecology received 110 requests from water users in the Yakima River basin to drill new or reactivate existing emergency wells. Ecology approved 96 requests, denied 11, and three were withdrawn by the applicants. As in 2001, the emergency permits contained the condition that water use had to be carefully measured and reported. Ecology provided compensatory mitigation for the future loss of water to the Yakima River by acquiring water rights equivalent to the water pumped under the emergency permits.

ASSISTING LOCAL CONSERVATION DISTRICTS

The Washington Conservation Commission received \$171,000 from Ecology to assist with the 2005 drought response. The commission allocated \$114,990 to eight conservation districts around the state that volunteered to assist. The Commission set aside \$56,010 for staff activities related to the drought, such as supporting district activities, contracting with Walla Walla Community College to produce irrigation water-management seminars, coordinating with the departments of Ecology and Fish and Wildlife to help prioritize response efforts, and answering questions from private landowners. Specific drought-related activities included:

Asotin County Conservation District

- Discussed options with several landowners
- Held irrigation water management seminar and training for private landowners
- Held a drought seminar for private landowners
- Performed irrigation water management planning, and loaned and installed soil moisture monitoring equipment on private lands

Chelan County Conservation District

- Met with local irrigation districts to plan drought strategy
- Coordinated workshops and published water conservation articles in newsletter

Clallam Conservation District

- Published newsletter articles and prepared maps
- Coordinated workshops for irrigation water management and backyard water conservation – 90 landowners attending the various workshops
- Purchased soil moisture monitoring equipment to loan to landowners willing to implement an irrigation water management plan
- Offered irrigation water management planning to farmers and conservation district staff through Walla Walla Community College

Columbia Conservation District

- Provided irrigation water management planning to private landowners

Foster Creek Conservation District

- Published newspaper and newsletter articles and updated a Web site
- Performed irrigation water management planning to private landowners
- Helped the Institute for Rural Innovation and Stewardship, Washington State University, and Ecology put on four seminars in drought critical areas throughout Central Washington

Kittitas County Conservation District

- Produced drought newsletter
- Administered cost share for extra pumps for a private landowner
- Funded eight on-farm efficiencies with an emphasis on drought
- Implemented irrigation water management planning for private landowners

TRANSPORTATION CONSERVES

Washington State Department of Transportation (WSDOT) looked at a variety of functional areas and activities for water use and water conservation opportunities. This information was used to develop an agency response plan for the anticipated water shortages in the summer and fall of 2005, as well as to change standard operating procedures for long-term water conservation. Water use estimates for 2004 and projected water use for 2005 activities helped identify areas for significant savings.

In response to anticipated water shortages, the Transportation Department set water conservation goals for construction projects and the operation of the department's facilities throughout the state. Water conservation methods focused on three main ideas:

- Using less water at construction sites
- Reducing the amount of vehicle washing
- Cutting back on water use at rest areas and landscaped roadsides

Meeting water needs while protecting landscape

The selected actions included:

- Not watering lawn and turf areas except for minimal, selected areas at rest stops and in the immediate vicinity of buildings.
- Thatching and aerating lawns.
- Mowing grass in a manner that promoted healthy root growth and shading soil surface
- Deferring planting contracts until fall where possible.
- Watering environmental mitigation and roadside planting sites with the minimum amount of water necessary to ensure plant survival.
- Applying mulches in planting areas and removing turf around the base of trees and shrubs to reduce competition from grass and to conserve soil moisture.
- Fertilizing and pruning at rest areas and other WSDOT facilities to limit plant growth and water consumption.
- Using drip irrigation and irrigation timers where practical for landscape areas.
- Adjusting irrigation systems for seasonal growth.
- Rezoning existing irrigation loops to separate lawn from tree and shrub beds due to different watering needs.

By implementing these conservation measures, WSDOT projected it would reduce its water consumption by 28 percent – from 339 million gallons in 2004 to 245 million gallons in 2005. Water savings in 2005 from implementation of landscape water conservation practices alone was estimated at 36 million gallons.

PROTECTING PUBLIC WATER SUPPLIES

State health agency manages drinking water problems

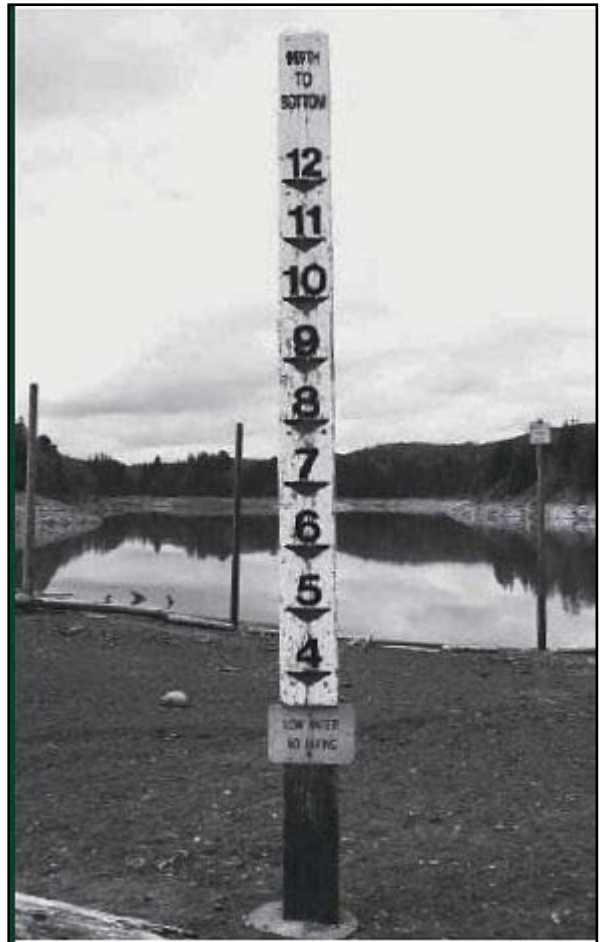
The Department of Health (DOH) led state efforts to help public water systems manage and conserve drinking water to reduce the risk of shortages or outages. DOH coordinated numerous drought-related drinking water activities, including:

- Awarding a \$235,000 grant to the city of Goldendale to construct an emergency well and abandon an emergency source at Bloodgood Springs.
- Adding, deepening or re-drilling wells for Stevens County Public Utility District (PUD), Pend Oreille PUD, Public Utility District of Klickitat County, Airway Heights and the Yakama Nation.
- Rehabilitating several water supply wells for the Moxee City and Grandview.
- Creating interties for Malaga Water District, Four Lakes Water District #10 and Okanogan County.
- Replacing leaky water mains for the Stemilt Irrigation District, Local Improvement District.
- Providing authorization and funding for Clallam County's emergency use of an existing well, construction of a new well, and pipelines for both wells.

Technical assistance and emergency response

DOH focused technical assistance primarily on helping small water systems prepare for and respond to drought-related problems. Staff responded to these specific efforts:

- Putting together a drought guidance package for DOH staff assisting water systems with drought-related problems.
- Conducting six Drought Readiness and Response workshops across the state. DOH provided technical staff to make presentations on drought, emergency actions and water shortage response planning. Approximately 140 water system operators and managers representing more than 150 systems attended the workshops.
- Providing technical assistance and helping develop solutions for several water systems experiencing water outages.
- Maintaining an after-hours hotline for emergency calls.



Department of Health photo

- Making water level probes available to help small water systems monitor their wells for possible water shortages.
- Developing a planning guide to help water systems prepare for water shortages.
- Working with Evergreen Rural Water of Washington to assess drought-related problems, identify solutions, and detect and repair leaks.

Water rights and supply augmentation

DOH provided input and assistance to water systems in need of emergency water rights to augment existing sources. DOH coordinated with Ecology on several applications for changes submitted by water systems. The transfers, changes and source augmentation projects were reviewed to determine their public health implications and benefits, affecting such systems as the Clallam Public Utilities District, the city of Goldendale and the Roza Irrigation District.

Emergency drought funding

Publicly-owned water systems, water districts, public utility districts and other special purpose districts that provide public drinking water received about \$2.76 million in emergency funding. DOH activities related to emergency drought funding included:

- Reviewing 18 emergency drought funding applications to assist failing water systems and making recommendations to Ecology.
- Providing direct technical assistance to several private water systems in forming a local improvement district to help them become eligible to receive public funding.
- Helping small water systems apply for funds to alleviate source problems.
- Conducting six drought readiness and response workshops targeting small water systems across the state.

SAFEGUARDING FISH AND STREAM FLOWS

Low stream levels threaten fish

When river flows drop and remain below normal, adult salmon have difficulties reaching upstream spawning grounds. Low stream flows and high water temperatures are deadly to fish, regardless of whether they are early-returning species like spring Chinook salmon in Columbia River tributaries such as the Walla Walla and Yakima rivers, or salmon populations that return later in the year, such as in the Dungeness River.

Some salmon spawn in smaller tributaries but spawning would occur in main stem waters if those smaller streams were inaccessible due to low flows. In some cases, stream flow dropped after the spawning. Salmon nests were dewatered and the eggs stranded. While Washington experienced many weeks of record daily low stream flows in many basins across the state, it is still too early to determine how the drought will affect future salmon runs.

Fisheries drought response team

The drought response team worked closely with federal, state and local biologists to identify streams and stream reaches where passage would be affected. For adult fish migrating upstream, WDFW considered the fish species present, migration timing, and character of the potential barrier. Passage considerations for down-stream migrating adult or juvenile salmon included



pool and side channel dewatering, excessive stream temperatures, and migration or run-timing.

The drought response team, as well as agency and tribal biologists, routinely monitored high risk areas for fish-passage obstructions. The potential barriers list changed as the drought progressed, with some projects dropped or modified and additional projects added. Due to planning, a cool summer, timely rainfall and stream flows, WDFW took no action on many projects.

Dead chum salmon in Kennedy Creek, a stream that experienced extremely low stream flows in late summer and fall.

Photo by Brad Caldwell, Ecology

WDFW did intervene in several areas to assist adult fish passage. Obstructing “recreational” rock dams were removed from:

- Raging River near Fall City.
- Teanaway River near Cle Elum.
- Taneum Creek near Ellensburg for adult Chinook salmon passage, and
- Tributaries to the Tucannon River near Starbuck for adult bull trout passage.

Additional projects:

- WDFW constructed a fish passage flume for adult bull trout in Box Canyon Creek (Lake Kachess) on Snoqualmie Pass.
- Cobble flow deflectors were installed for bull trout passage on Gold Creek (tributary to Lake Keechelus) on Snoqualmie Pass and on Canyon Creek (tributary to the North Fork Nooksack River near Deming) for spring Chinook.
- A fish passage channel was created at the mouth of the Kalama River near Kalama to facilitate Chinook and Coho salmon passage.
- The river channel upstream of the Lyle Falls fishways on the Klickitat River near Lyle was also modified to facilitate passage for adult Chinook, bull trout, Coho salmon and steelhead.

Three aquatic weed removal projects were completed for adult salmon passage:

- Chimacum Creek near Port Townsend for summer chum salmon.
- Hamilton and Hardy Creeks near North Bonneville for Columbia River chum salmon.
- A fish way modification was made in addition to vegetation removal on Duncan Creek, also near North Bonneville.

WDFW funded and permitted a large project to facilitate upstream passage for adult Chinook and steelhead on the Washougal River near Camas. This project was sponsored and installed by the Lower Columbia River Regional Fisheries Enhancement Group. For a list of projects funded through WDFW, see **Appendix B**.

Fish habitat accomplishments

Source exchanges

WDFW explored the feasibility of “source exchanges” to aid stream flows in the Pilchuck River, Issaquah Creek, and Rock Creek. Source exchanges involve a utility stopping water use from an affected stream (or connected groundwater source) and buying replacement water from another utility, using state funds. One source exchange project WDFW considered involved the city of Snohomish receiving water from the city of Everett and stopping water use that affected the Pilchuck River.

WDFW should continue to explore source exchange opportunities where they make sense for fish, even in non-drought situations.

Pulse flows

To create a pulse flow, a significant surface water diversion is stopped abruptly for a short period of time. The resulting increase in stream flow (pulse) mimics a natural rain and stream run-off event. Pulse flows have been used successfully elsewhere to improve migration conditions for both juvenile and adult salmon. Flow pulses can also be a more cost-effective approach for improving passage for salmon than lesser flow increases over a longer period of time. Agricultural producers are minimally affected and receive payment for forgone water use.

- WDFW and the Washington Water Trust (private non-profit organization) successfully negotiated contracts with both the Eastside #7 and Westside #6 irrigation districts to provide pulse flows in the lower Touchet River and Walla Walla rivers. The intent was to have coordinated rolling flow pulses to move smolts when low flows or stream temperatures neared unhealthy levels. The Walla Walla and Touchet pulse flows proved unnecessary in 2005 because unexpected natural rainfall and run-off occurred and the fish migrated naturally.
- On the Dungeness River, WDFW joined in an agreement with NOAA Fisheries, the Jamestown S'Klallam Tribe, Ecology, and irrigators to provide pulse flows in early September. Under the agreement, Ecology provided trucked-in water to irrigators. The irrigators, in return, shut down their ditch withdrawals for a 24-hour period. This provided about a 20 percent increase in flows to the lower river. The flows worked to induce the upstream movement of several hundred pink and Chinook salmon. Without the flows, the fish were not moving from the lower river and could not reach upper spawning grounds.

WILDFIRE PREVENTION AND RESPONSE

Governor Gregoire's March drought emergency authorization resulted in the Department of Natural Resources (DNR) receiving an additional \$200,000 to help prepare for the wildfire season. Although DNR prepares each year for a potentially severe wildfire season, this funding permitted the agency to hire seasonal firefighters earlier than usual to help prepare fire response equipment, conduct training and begin patrols.

Although seasonal spring rains tempered the drought somewhat, fuel moisture levels remained abnormally low, particularly in high elevation areas that lacked normal snowpack coverage. Following a rather typical period, rains began to fall in September and tempered the wildfire threat across many areas. Overall, the 2005 weather pattern contributed to an active but relatively short wildfire season, concentrated during the months of July and August.

Wildfire prevention efforts

The public awareness created by the drought declaration enhanced forest fire protection efforts in 2005. The media attention generated by the drought, along with ongoing public education efforts, contributed to a dramatic decline in human-caused wildfires. The reported occurrences of several major causes of forest fires (arson, children, debris burning, and smokers) on DNR-protected land were at their lowest levels in more than 30 years.

Focused fire prevention efforts also contributed to a reduction in forest fires. Interagency Fire Prevention Education Teams were deployed at times of high wildfire risk to raise public awareness of wildfire hazards. The efforts of Fire Prevention Teams activated over the Independence Day and Labor Day holidays produced a measurable decrease in fireworks and recreational fires in the areas where they were deployed.



Washington Department of Natural Resources photo

Wildfire numbers less than anticipated

During 2005, DNR firefighters responded to more than 1,200 reports of wildfire. Although nearly one-third of the fire reports were false alarms, about half were actual wildfires on DNR-protected lands that required suppression action. Approximately 35,800 acres burned during 2005 – or about 0.28 percent of the 12.7 million acres that DNR protects. The number of wildfires in 2005 was about 75 percent of the average for the previous five-year period, however, the acreage burned was over three times greater. One incident – the School fire in southeastern Washington – accounted for 52,000 acres of the total DNR-protected acreage that burned in 2005. Besides destroying public and private property, state Fish and Wildlife officials also estimate that near half the elk and bighorn sheep and a third of the deer in the Tucannon Game Management Unit were lost in the fire. A map on Washington mobilization fires is included as **Appendix C**.

DNR controlled 605 of 645 wildfires (94 percent) within its jurisdiction before they reached 10 acres in size. This is significant, because controlling small wildfires is safer and reduces losses to natural resources and developed property. It is also important for controlling fire suppression costs, because historical data reveal that although less than one percent of DNR wildfires grow larger than 100 acres, these fires are responsible for about three-quarters of total fire suppression expenses. The 11 DNR wildfires that grew larger than 100 acres (shown in the following table) required:

- Elite incident management teams
- Commitment of large quantities of fire suppression resources
- An estimated \$18 million in DNR funds to control

<u>2005 Large Wildland Fires in Washington</u> (acreage and cost figures include DNR and other state, federal and local jurisdictions)				
Start Date	Fire Name	County	Acres	Estimated costs
7/3/2005	Pearrygin Lake	Okanogan	530	\$1,000,000
7/4/2005	Second HUDS	Okanogan	4,274	\$2,001,000
7/12/2005	West Omak Lake	Okanogan	11,325	\$2,004,000
7/24/2005	Wood Gulch	Klickitat	5,400	\$500,000
7/31/2005	Dirty Face	Chelan	1,150	\$6,650,000
8/4/2005	Lick Creek	Kittitas	735	\$2,900,000
8/5/2005	School	Columbia, Garfield	52,000	\$15,100,000
8/7/2005	Burnt Bread	Okanogan	1,356	\$2,030,000
8/10/2005	Harker Canyon	Lincoln	1,566	\$950,000
9/8/2005	Squaw Creek	Okanogan	1,100	\$1,000,000
9/28/2005	Martin Road	Stevens	890	\$940,000

These large wildfires burned across 80,000 acres of different federal, state and local jurisdictions, and cost these agencies about \$36 million. Four involved commitment of resources under authorization of the [Fire Services Resource Mobilization Act](#).

GETTING THE WORD OUT

Press releases

In order to deliver effective, timely information to the public and the media, the state created a special Drought Communications Group comprised of public information, outreach and technical staff. Agencies that provided consistent, integrated outreach included:

- Agriculture
- Community, Trade and Economic Development
- Ecology
- Fish & Wildlife
- Governor's Office
- Health
- Military
- Natural Resources
- Office of Financial Management
- Washington Conservation Commission
- Washington State Patrol, Fire Marshal's Office
- U.S. Geological Survey
- Seattle Public Utilities
- Washington Farm Bureau

The Drought Communications Group worked together to provide:

- Weekly media releases from March through September describing various drought-related activities around the state.
- Timely updates on energy and water supply conditions.
- A \$100,000 newspaper ad campaign in which water conservation messages were placed in nearly every weekly and daily newspaper in Eastern Washington. The campaign began during Memorial Day weekend and ended after Labor Day.

Between March 10 and September 30, Ecology distributed 33 drought-related news releases, assisted by numerous agencies and interest groups. Newspaper, radio and television media from nearly every Washington community interviewed members of the communications group. The departments of Agriculture, Fish & Wildlife, General Administration, Health and Natural Resources also contributed guest opinion and editorial articles to state newspapers. A list of agency drought contacts is referenced in **Appendix D**.

Ecology Director Jay Manning and Agriculture Director Valoria Loveland taped a television interview in partnership with Comcast that appeared on CNN Headline News in Western Washington. This professionally produced five-minute news interview was seen each hour, reaching a potential audience of one million households.



In late March, Ecology launched a special toll-free hotline, (800) 468-0261, to answer public queries about the drought emergency. The department also created a special “2005 Drought” Web site that:

- Described water conservation measures.
- Provided energy, weather and water supply updates.
- Outlined how water users could apply for emergency drought permits, temporary water-right transfers and financial assistance.

Links to the special 2005 Drought Web page were provided by all state agencies responding to the drought emergency, many federal agencies monitoring water-supply conditions and weather, and various local governments including Seattle and Tacoma.

Additionally, WDFW posted its drought plans to protect fish and stream flows on its Web site. DNR posted fire prevention and firefighting information. DOH established a Web site for water systems and the public to obtain key drought information. The WSDA Web site contained information about a variety of drought issues, including sources for emergency funding.

Fish & Wildlife outreach

WDFW’s drought response has been featured on the agency’s Web page and is linked from Ecology’s Web page. The department featured the Box Canyon fish passage project in the November edition of “Wild about Washington,” which is distributed to public television stations statewide. The Fish and Wildlife Commission’s June 17 meeting, televised on TVW, included a drought presentation. A recreational rock dam removal project was featured by three Seattle television stations. WDFW contributed to drought-related news releases with King County and the Central Puget Sound Water Suppliers Forum.

WDFW posted hundreds of laminated, weatherproof “Let’Em Pass” posters statewide (see **Appendix E**). The department developed an educational sign that warned about the negative effects of temporary dams for bull trout and salmon passage. Usually the hand-built dams were constructed of streambed rocks or logs, located in or near public campgrounds. The signs notified the public that these structures are illegal and harmful to fish. WDFW and campground staff succeeded in reducing the numbers and size of these dams. The department developed a sign that was posted after a drought project was completed, notifying the public that the work instream was an emergency drought project. Signs were also posted at many boat launches across the state warning of the hazards to the public of boating in shallow water.

Health assists small water systems

In July, the state Department of Health (DOH) distributed a special drought-related issue of its newsletter, *Water Tap*, which was sent to more than 11,000 public water systems statewide. The issue focused on drought readiness and response.

Staff created a new pamphlet titled “Emergency Drinking Water Sources, Requirements for Using Emergency Sources Safely,” sent in July to more than 900 water systems with an identified emergency source. The pamphlet was also available on the DOH Web site and at drought workshops and public meetings.

DOH developed a new Water Shortage Response Planning Guide with examples and a blank template to help water systems prepare their response plan. The department also conducted a phone survey of 12 large water systems that were identified as being highly vulnerable to drought. No major problems were reported.

DOH conducted six workshops, in partnership with Evergreen Rural Water of Washington, in key communities around the state experiencing drought effects. Training included drought readiness response, leak detection and water conservation.

Agriculture information helps farmers

The state Department of Agriculture (WSDA) held its first Drought Response Action Team meeting on March 31. Stakeholder groups were given a briefing regarding what state and federal agencies were doing to assist with drought. Industry groups represented included: tree fruit, wheat, vegetable, livestock, dairy, hops, food processors and nurseries.

Director Loveland implemented two “director’s forums” as a way to visit communities to see the effects of drought firsthand. The forums were held in Yakima and Mount Vernon. She was joined in Yakima by 70 people from a broad cross-section of the community. Issues included:

- Water storage
- Anticipated loss of drinking water in White Swan
- Increasing insurance rates
- Mechanisms that local governments can use to track disaster assistance within their communities
- Disaster assistance programs available for farmers
- Disaster assistance funding for equipment
- Wapato Irrigation District issues

The town hall meeting in Mount Vernon attracted 35 people. Many issues surfaced that the agency will be following up, including:

- Water storage
- Impacts to the nursery industry
- Groundwater versus surface water issues

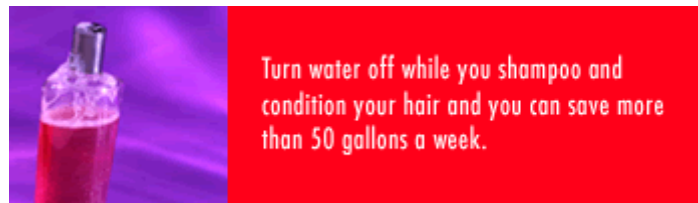
- Diversions
- Agri-lite insurance

WSDA staff communicates regularly with stakeholders regarding specific industry issues, such as:

- Individual farmers on financial assistance resources
- Livestock industry on grazing issues
- Nursery industry on economic impacts

WSDA contracted with the U.S. Department of Agriculture and Washington State University to provide customized risk-management programs to specialty crop producers. The programs provided training to help producers make better use of financial management, crop insurance, marketing contracts and other risk-management tools. This year-long program may be extended as needed.

WSDA and the Washington State Outreach Council helped establish an Informational Resource Network/Crisis Hotline. This service helps members of the agricultural community contact organizations for assistance.



www.wateruseitwisely.com

State partners with local governments and health departments

Agencies provided an integrated statewide outreach effort. Examples follow:

- The state Executive Water Emergency and Water Supply Availability committees conducted joint public meetings in Wenatchee, Yakima, Deer Park and Port Angeles. State agencies supplied information regarding a variety of grants and loans. Individuals received local service referrals, as well as shared information about local drought conditions with committee members.
- Drought and water conservation outreach materials and information were provided to Yakima-area schools and utility districts, local governments, and individuals in Colville, Newport, Kettle Falls, Spokane, Moses Lake, Walla Walla, Prosser, Colfax, and Leavenworth.
- A partnership was formed with the city of Spokane to provide water conservation materials and network with groups regarding water conservation. This activity occurred at the same

time DOH was developing their water use efficiency rules and reaching out to municipal water suppliers.

- Drought and water conservation materials were distributed through county fairs, teacher and environmental groups, non-profit educational and neighborhood groups, and local governments. These materials were used to support the “Water Use It Wisely” ad campaign. Conservation tips appeared in press releases.
- Ecology also developed significant partnerships with the city of Olympia, Spokane Conservation District and Puget Sound Water Coalition to provide free conservation materials to several thousand homes statewide.

BUDGET & EXPENDITURES

Past drought response money tapped

When the statewide drought emergency was declared March 10, Ecology quickly mobilized state drought response resources. The drought declaration opened with about \$2.1 million in the state Drought Preparedness and Emergency Water Revolving accounts available for the 2005 drought emergency. As of December 31, 2005, about \$1.5 million was provided to the departments of Agriculture, Ecology, Fish and Wildlife, Health and the state Conservation Commission to hire temporary employees to help respond to the emergency. Another \$308,185 was used to lease water rights in the Yakima and Walla Walla watersheds to mitigate for domestic and municipal uses and maintain flows in critical salmon-bearing streams.

Lining up more response funds

When the drought declaration was made in March, the 2005 Legislature provided another \$8.2 million in emergency drought funding. Ecology hired an education and outreach coordinator to provide information to communities statewide.

Committed drought-related projects and activities

Ecology oversees drought-related expenditures in Washington. In order to respond to the drought, Ecology committed about:

- \$3.25 million for public agricultural irrigation projects.
- \$2.77 million to municipal water utilities for emergency drought funding.
- \$1 million to WDFW for salmon and trout protection.
- \$1.3 million for Yakima emergency well pumping mitigation.
- \$1.5 million to hire temporary state staff to respond to the drought emergency.
- \$308,185 to lease water rights in the Yakima and Walla Walla river basins, including the town of Roslyn and surrounding camps, campgrounds and small water systems.

Expenditures

As of December 31, 2005, Ecology's drought operating expenditures and obligations were approximately \$1.5 million and capital expenditures and obligations were about \$7 million. Additional detail regarding the capital budget is contained in **Appendix A**.

The above operating expenditures and obligations include the following amounts contracted to other agencies:

FY 2005 (July 1, 2004, through June 30, 2005)		FY2006 (July 1, 2005, through June 30, 2006)	
DOH	\$38,692	DOH	\$65,000
WDFW	\$48,007	WDFW	\$100,000
WSDA	\$32,501	WSDA	\$58,000
WCC	\$9,704	WCC	\$102,000
WVC drought seminars	\$10,000	CTED advertising campaign	\$100,000
		CTED economic study	\$100,000

RECOMMENDATIONS

Recent drought response experiences present an opportunity to reevaluate the state's approach to help minimize future drought effects, meet emergency needs, and address growing concerns over the potential water-supply effects of climate change.

All state agencies responsible for drought response learned an array of lessons and identified important tools to be better prepared for and respond to future drought emergencies. The Department of Ecology has forwarded a set of specific recommendations for the state Joint Legislative Committee on Water Supply During Drought to consider. These recommendations center around four primary themes:

- Reviewing the current state system about how droughts are declared,
- Possible ideas for improving water supply availability information,
- Ways the current system for leasing and purchasing water rights might be enhanced, and
- Modifying current funding mechanisms.

Reviewing drought declaration system

Under the existing system, a drought emergency can be declared for a particular county, river basin, sub-basin or even statewide when conditions meet the existing statutory definition of a water-supply emergency. However, a formal emergency declaration must be in place before Ecology can consider drought-related water-right change requests or disburse emergency drought money. In addition, unlike other entities such as public water purveyors, the state does not have authority to implement regional or statewide water-shortage advisories or warnings prior to declaring a drought emergency.

The Committee may wish to review the existing formal drought declaration system. There may be the potential for a phased approach to a drought declaration based on timing, location and effects on various sectors. The review could assess options for a phased approach and relative advantages and disadvantages. Ecology would support lawmakers in studying this important issue.

Improving water availability information

Ecology's recommendations regarding improving water availability information include:

- Formally establishing by statute and appropriating funds for an Office of State Climatologist to help the state assess climate, weather and water supply information. Authoritative and independent information and judgments in this rapidly evolving field is critical to developing sound policy and effective drought response actions. Such services may be especially important to support a phased approach for drought declarations.

- Continued commitment to put more gauges in state streams to monitor surface water conditions in real-time and to compare with historical data. Information about how much water is flowing in state streams is an essential tool for managing water resources and matching water supply with demand. This action also would help determine long-term water availability trends. Declining federal support for the U.S. Geological Survey gauging network makes the state gauging network even more important.
- Putting more focus on developing information about groundwater. While much reliable information exists about state surface water, less is understood about groundwater supplies including how and when groundwater is affected by drought. There is growing concern about declining groundwater levels, especially in Eastern Washington. The state should consider investing in high priority area-specific studies and engage local partners and U.S. Geological Survey to develop needed information.
- Improving water management information systems including geographic mapping capabilities. This would involve increased coverage and Internet access to stream flow information and mapping the location of water rights, particularly in drought-sensitive watersheds. Such improvements would increase the state's ability to more closely target drought response efforts to match local conditions. This becomes more important if phased approaches to drought declarations are considered. Providing timely, accurate, and locally-detailed water information deepens and broadens understanding of water conditions.

Changes to current water transaction program

Ecology's recommendations regarding improving water-right transactions include:

- Consider changing existing water law to clearly authorize water banking beyond the Yakima River basin. Water banking can work independently or in conjunction with storage as a long-term solution to water supply variability and matches willing buyers with willing sellers.
- Authorizing the current state Drought Preparedness Account to pay annual-option payments for water right leases. By obtaining dry-year options with a 20-year minimum term, the state may be able to obtain leased water at a lower price. It would also help Ecology and other state agencies deploy staff to other critical response needs in the weeks following a declared drought emergency, rather than scrambling for short-term leases. The 2001 and 2005 droughts allowed the state to successfully test and refine mitigation banking as a key part of its drought response strategy in the Yakima basin.
- Support marketing the state water right buying and leasing program, especially to agricultural groups, local governments, and other major water users. Familiarizing people with the program would prepare them to participate in a water market in advance of a drought rather than during a water-shortage emergency. In some critical locations, state agencies found it difficult to buy and lease water. Once a drought emergency is declared, competition for water coupled with the water community's unfamiliarity with the state water right buying and leasing program significantly limited the state's ability to purchase water at a less-than-premium price.

Funding mechanism updates

Ecology's recommendations regarding drought-related funding include:

- Consider authorizing standby bonding authority for the state Drought Preparedness Account. This would allow bonds to be sold on an as-needed basis and sized to the severity of annual needs during a declared drought and avoid issuing bonds for a big multi-year block or using creative budgeting and accounting approaches during drought emergencies. A bond account was created and all bonds sold in 1977 to raise \$20 million to help respond to the worst drought on state record. However, not all the money was used when the bonds were first sold 28 years ago. Remaining balances have been used to provide general assistance in preparing for drought and responding to drought emergencies in 1992, 1994, 2001, and 2005. The current balance for these funds is now at about \$1.1 million. Authorization of a standby account would help the state be better prepared for future drought emergencies.
- Investing about \$200,000 to purchase water rights in the Yakima basin to permanently transfer water to 134 water-right holders who currently hold junior (post-1905) water rights that can be interrupted during water shortages, especially droughts. The state would get back its investment from each junior water-right holder based on their particular water needs. Ecology will need authority to collect the revenue.

Apart from potential statutory and budget changes, Ecology also is reviewing what improvements can be done administratively and procedurally to improve the department's drought response capabilities and help minimize long-term drought effects.

Related considerations

In addition, the departments of Agriculture, Ecology, Fish and Wildlife, and Health, the Department of Community, Trade and Economic Development, and the Washington Conservation Commission have identified other recommendations. These include:

- The state Executive Water Emergency and Water Supply Availability committees may want to continue meeting to monitor and act on water supply issues, given the serious nature of possible water shortages.
- Every January, the Governor's Office and state agencies need to consider preparing for a potential drought, knowing there will be uncertainty between January and March. Observations of unusual weather patterns are now common. If the state water supply and drought committees wait until a "drought" occurs, it could be too late to respond effectively to emergent needs.
- Upon reviewing state weather patterns during the last 15 years, Washington appears to be moving into ongoing climate change. Consideration should be given to the ongoing nature of drought and perhaps redefine what constitutes a drought emergency. This becomes particularly important if phased approaches to drought declarations are considered.
- The Department of Health (DOH) could inform small, privately-owned water systems that funding for emergency wells can be obtained through the formation of Local Improvement Districts (LIDs).

- Small, private non-profit water purveyors had difficulty accessing funds. To assist them with emergency needs, DOH recommends helping them form LIDs to make them eligible to receive block grants or funds.
- The role of and access to Indian tribes is sometimes uncertain. A possible solution for future droughts is to invite a member of the state Indian Affairs Commission to participate as a representative on the state Executive Water Emergency Committee and Drought Communications Task Force.
- Opportunities to access block grant funding and wildlife protection funds are not necessarily found in the existing drought rule. A rule revision may be the best solution.
- It is essential to have more proactive communications between municipalities and state agencies regarding fish protection.
- Set up drought and habitat protection agreements with federal agencies such as U.S. Army Corps of Engineers and NOAA Fisheries Service.
- Continue to build on the successful relationships with local entities across the state regarding water conservation, climate change and drought. It takes tremendous energy to activate and recharge these relationships if they are allowed to lapse.
- Develop outreach materials at the state level that can be adapted by local educators, governments and other organizations to fit local needs.
- Conduct more drought-specific workshops in areas experiencing water shortages. Public workshops in some key areas of the state, like those put on by Evergreen Rural Water, were useful and well received.
- Maintain ongoing water conservation outreach. Consider creating a full-time outreach position at DOH to carry key messages forward.

FUTURE OUTLOOK AND PREPARATION

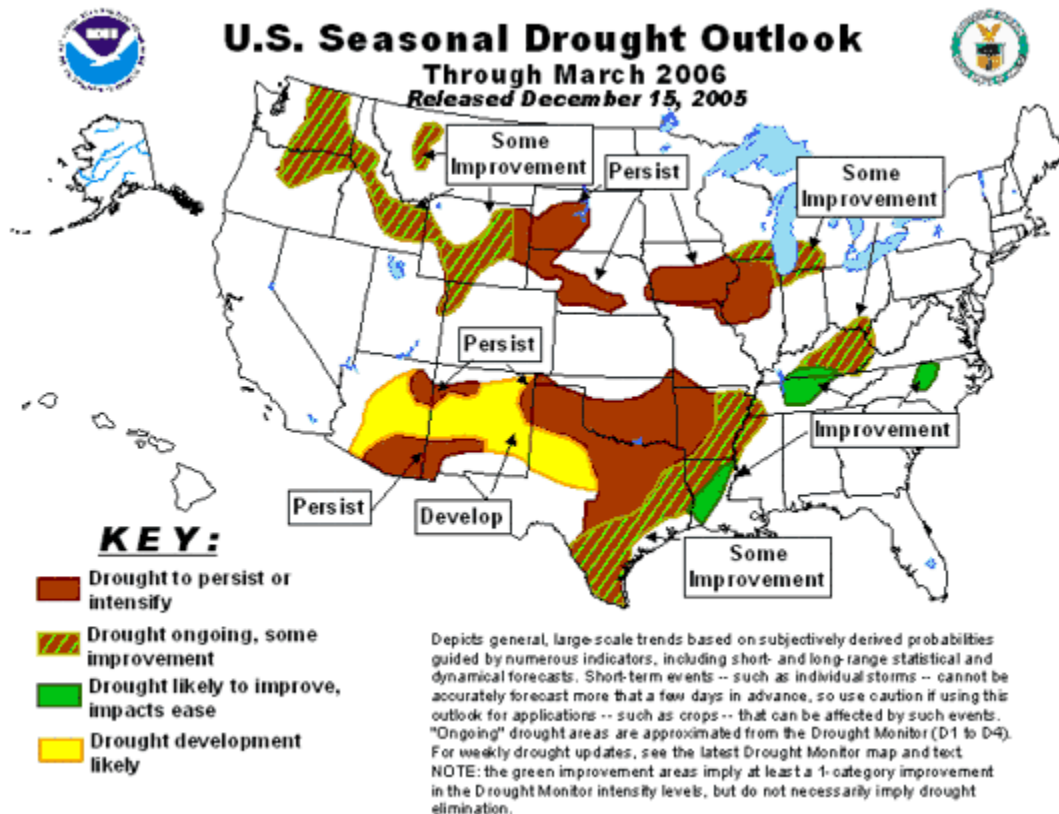
Latest trend: Looking wet

Although the drought emergency declaration expired on December 31, 2005, the new water year began on October 1, 2005, and ends on September 30, 2006. Although the wettest months – January through April – lay ahead, the current wetter-than-normal precipitation levels reduce the possibility of a multi-year drought.

As of January 30, 2006, mountain snowpack levels were between 99 and 134 percent of normal. In Eastern Washington, the state is watching reservoir levels in dams on the upper Yakima River. If good snowpack conditions persist, the reservoirs should refill fully.

Could see temperatures warmer-than-normal

Although there are no strong climate signals regarding the upcoming winter weather, there are indications that a weak La Niña pattern is likely through early summer. If that happens, the Pacific Northwest could see warmer-than-normal temperatures much of the winter and spring. Warmer temperatures also could cause mountain snowpack to melt earlier than normal.



Preparing for the future

The Department of Community, Trade and Economic Development (CTED) has contracted with the Center for Water and Watershed Studies at the University of Washington to develop recommendations regarding drought vulnerabilities in Washington. The Center will conduct a four-part study to complete the following:

- An assessment of the potential for water shortages and droughts, including an analysis of impacts from recent droughts, why the impacts occurred, and how they might be reduced in the future.
- An assessment of risk reduction activities using drought impact information from the most vulnerable areas of the state.
- Identification of indicators to monitor and forecast drought conditions, characterize and compare drought severity, and provide a basis for triggering drought responses.
- The identification of responses to effectively reduce drought impacts.

The \$100,000 contract, paid by Ecology, is effective from September 1, 2005, through August 31, 2006. During that time, the Center will:

- Conduct interviews, focus groups, surveys, and meetings with stakeholders throughout the state regarding water resources and drought vulnerabilities.
- Gather and analyze drought-related data.
- Investigate best practices and mitigation actions.
- Develop summaries and recommendations.

A steering committee comprised of representatives from the departments of Agriculture, Ecology and CTED, Washington State University, and the Governor's Office will help provide guidance for this effort.

APPENDIX A

Drought Capital Project Obligations

(All grants except where noted)

	Ag 9H803	Muni 9H804	Habitat 9H802 ¹	Acquisition 9H801 ²	Total
Budget	\$3,350,000	\$ 2,550,000	\$ 1,000,000	\$1,300,000	\$ 8,200,000
Wenatchee Heights Rec Dist	\$ 350,000				\$ 350,000
Wenatchee Heights Rec Dist	\$ 350,000 (loan)				\$ 350,000
Okanogan ID	\$ 230,000				\$ 230,000
Roza ID	\$1,401,073				\$ 1,401,073
WDFW			\$ 1,000,000		\$ 1,000,000
Yakama Nation	\$ 220,000				\$ 220,000
Icicle Irrigation District	\$ 15,543				\$ 15,543
Kittitas County Conservation District	\$ 17,120				\$ 17,120
City of Goldendale		\$ 235,000			\$ 235,000
Stevens PUD		\$ 121,000			\$ 121,000
PUD#1 Pend Oreille Co.		\$ 235,000			\$ 235,000
Kittitas Reclamation District	\$ 335,000				\$ 335,000
Kennewick Irrigation District	\$ 335,000				\$ 335,000
Three Lakes Water District		\$ 200,000			\$ 200,000
Peshastin Water District		\$ 108,500			\$ 108,500
Malaga Water District		\$ 200,000			\$ 200,000
Steven Co PUD		\$ 3,231			\$ 3,231
City of Airway Heights		\$ 30,640			\$ 30,640
PUD#1 of Clallam County		\$ 210,000			\$ 210,000
Four Lakes Water District #10		\$ 231,900			\$ 231,900
Okanogan County		\$ 235,000			\$ 235,000
Stevens Public Utility District		\$ 99,000			\$ 99,000
Yakama Nation		\$ 235,000			\$ 235,000
Moxee City		\$ 125,000			\$ 125,000
City of Grandview		\$ 235,000			\$ 235,000
Yakima County – Rock Ridge		\$ 235,000			\$ 235,000
Valley of the Horses Water District No. 12		\$ 30,000			\$ 30,000
Total	\$3,253,736	\$2,769,271	\$1,000,000	\$1,300,000	\$ 7,023,007
Remaining	\$ 96,264	\$ (219,271)		\$1,300,000	\$ 1,176,993

¹ The habitat project funds committed to WDFW will likely be about \$450,000 less than originally budgeted.

² The water mitigation program for the Yakima River basin will likely be about \$500,000 less than anticipated.

APPENDIX B

WDFW Expenditures & Projects

December 7, 2005 estimate

Capital Projects	Budgeted for projects & contingencies	Estimated Final expenditures*	
		State (estimated)	Federal/other
<i>Hatchery Water Supply</i>	192,200	288,720	
<i>Fish Disease Treatment</i>	33,580	40,200	
<i>Water Access Sites</i>	57,500	33,500	
<i>Fish Salvage & Transfer</i>	42,500	52,500	
<i>Fishery and Stream Monitoring</i>	12,000	10,256	
<i>Temporary Fish Passage Modifications</i>	662,220	202,838	10,000
<i>totals</i>	1,000,000	628,014	10,000
Drought Response Operations			
<i>Drought Team Management and Admin.</i>	150,000	150,000	
Grand Total			
		1,150,000	778,014
Projects are still being completed. Final costs are not yet in; normal cost accounting delays.			

WDFW Closeout Report: Proposed Early Action Drought Projects

Hatchery water supply	
Elochoman hatchery diversion structure modifications	8,500
Washougal hatchery increased pumping	10,000
Grays River hatchery oxygenation	2,000
Goldendale hatchery water supply spring rehabilitation	7,000
Mossyrock hatchery increased pumping	2,500
North Toutle hatchery holding pond improvements	13,500
Kendall Creek hatchery flow supplementation	12,000
Wallace River hatchery aeration	4,500
Marblemount hatchery flow supplementation	6,500
Lake Whatcom flow supplementation	2,500
Vancouver hatchery increased pumping	10,000
Elochoman hatchery holding pond modification	4,500
Colville hatchery groundwater supply modifications	10,500
subtotal	\$94,000
Fish disease treatment	
Kalama Falls disease control salt	2,000
Skamania hatchery disease control formalin	10,000
subtotal	\$12,000
Water access sites	
Samish Lake access ramp extension	20,000
Big Lake access ramp sediment removal (Skagit County)	2,500
Clear Lake access ramp extension (Thurston Co.)	12,000
Clear Lake access ramp extension (Spokane Co.)	5,000
Lake Isabella access ramp extension (Mason Co.)	12,000
Williams Lake access ramp extension (Spokane Co.)	5,000
Access area drought safety signage	1,000
subtotal	\$57,500
Fish salvage and transfer operations	
S.E. Washington fish salvage operations	12,000
Klickitat falls fish way 5 trap improvements	12,500
subtotal	\$24,500
Fishery and stream monitoring	
Umatilla spring Chinook fishery monitoring	\$12,000
subtotal	\$12,000
Grand Total	\$200,000

WDFW 2005 Drought Proposed Projects Budget Amendment

Hatchery Water Supply			
Lake Whatcom Flow Supplementation	WRIA 1	1,200	
Kendall Creek Hatchery– Phase 2 Flow Supplementation	WRIA 1	12,000	
Marblemount Hatchery – Phase 2 Flow Supplementation	WRIA 4	9,000	
Elwha Hatchery - Well Supplementation	WRIA 18	20,000	
Puget Sound and Coastal Hatcheries Dissolved Oxygen Meters	WRIA 1-24	15,000	
Goldendale Spring and Hatchery Resealing – Phase 2	WRIA 30	15,000	
Aeneas Lake Aeration Units	WRIA 49	3,000	
Colville Hatchery Well - Phase 2	WRIA 59	23,000	
	subtotal:		\$98,200
Fish Disease Treatment			
Bellingham Hatchery	WRIA 1	4,000	
Soos Creek Hatchery	WRIA 9	11,720	
Voights Creek Hatchery	WRIA 10	5,860	
	subtotal:		\$21,580
Fish Salvage and Transfer Operations			
Voight's Creek Adult Trap	WRIA 10	18,000	
	subtotal:		\$18,000
Temporary Fish Passage Modifications			
Canyon Creek	WRIA 01	4,800	
Padden Creek	WRIA 01	4,800	
Samish River	WRIA 02	11,600	
Skagit River	WRIA 04	14,600	
Stillaguamish River	WRIA 05	14,600	
Grant Creek	WRIA 05	4,600	
Squire Creek	WRIA 05	6,700	

Jim Creek	WRIA 05	6,800
Canyon Creek	WRIA 05	6,830
SF Stillaguamish River	WRIA 05	4,000
Granite Falls Fish Way Maintenance	WRIA 05	5,200
Pilchuck River	WRIA 07	14,600
Raging River	WRIA 07	6,800
Wallace River	WRIA 07	6,800
Sammamish River	WRIA 08	6,800
Bear Creek	WRIA 08	4,800
Evans Creek	WRIA 08	4,800
Cottage Creek	WRIA 08	4,800
Issaquah Creek	WRIA 08	6,800
Coal Creek	WRIA 08	9,000
Rock Creek	WRIA 09	4,800
Newaukum Creek	WRIA 09	6,800
Puyallup River	WRIA 10	14,600
Clarks Creek	WRIA 10	4,800
White River	WRIA 10	14,600
Boise Creek	WRIA 10	4,800
Clearwater River	WRIA 10	11,600
Greenwater River	WRIA 10	11,600
Fennel Creek	WRIA 10	4,800
Carbon River	WRIA 10	11,600
South Prairie Creek	WRIA 10	6,800
Gale Creek	WRIA 10	4,800
Fiske Creek	WRIA 10	4,500
Kapowsin Creek	WRIA 10	4,800
Fox Creek	WRIA 10	4,500
Chimacum Creek	WRIA 17	11,300
Snow Creek	WRIA 17	4,800
Salmon Creek	WRIA 17	4,800
Dungeness River	WRIA 18	11,600
Gray Wolf River	WRIA 18	11,600
Elwha River	WRIA 18	11,600
Clallam River	WRIA 19	11,600
Quillayute River	WRIA 20	11,600
Hoh River	WRIA 20	11,600
Toutle River	WRIA 26	14,600
Washougal River	WRIA 28	3,960

Hamilton Springs	WRIA 28	4,900
Washougal River	WRIA 28	21,300
Duncan Creek	WRIA 28	10,400
Swale Creek	WRIA 30	4,800
Little Klickitat River	WRIA 30	11,600
Walla Walla River	WRIA 32	30,000
Rattlesnake Creek	WRIA 38	5,000
Wenatchee River	WRIA 45	2,500
Chiwakum River	WRIA 45	2,500
Peshastin Creek	WRIA 45	2,500
Chumstick Creek	WRIA 45	2,500
Entiat R. (Knapp-Wham and Hamma Divs.)	WRIA 46	2,500
Entiat R. (McKenzie Divs. Over Check Dam)	WRIA 46	2,500
Entiat River	WRIA 46	5,000
Mad River	WRIA 46	2,500
Roaring Creek	WRIA 46	2,500
25 Mile Creek	WRIA 47	2,500
Chelan River	WRIA 47	2,500
First Creek	WRIA 47	1,000
Beaver Creek	WRIA 48	3,000
Gold Creek	WRIA 48	2,500
Trinidad Creek	WRIA 48	2,500
Wolf Creek	WRIA 48	2,500
Beaver Creek (Wenatchee River)	WRIA 48	2,500
Unidentified Contingency Temporary Fish Passage Projects	VARIOUS WRIAS	156,030
	subtotal:	\$662,220
	GRAND TOTAL	\$800,000

APPENDIX C

2005 Washington Mobilization Fires



APPENDIX D

Agency Contacts

Washington Department of Agriculture (WSDA)

Drought Response Action Team activities:

- Kelly Wicker, (360) 725-5499

Washington Department of Ecology (Ecology)

Water Resources Program Manager/funding issues:

- Ken Slattery, (360) 407-6602

Water supply outlook:

- Brian Walsh, (360) 407-6647

Drought Web page coordinator:

- Chris Anderson, (360) 407-6634

Drought-related media coordinator:

- Curt Hart, (360) 407-7139

Washington Department of Fish and Wildlife (WDFW)

Fish and stream flows:

- Carl Samuelson, (360) 902-2563

Washington Department of Health (DOH)

Public water supply issues:

- Ginny Stern, (360) 236-3134

Washington Conservation Commission (WCC)

Local conservation district activities:

- Jon Culp, (509) 826-7212

Washington Department of Natural Resources (DNR)

Fire fighting, fire management, outreach:

- Janet Pierce, (360) 902-1122
- Roger Autry, (360) 902-1781

Washington State Fire Marshal

Fire management:

- Dan Johnson, (360) 753-0498

APPENDIX E

Fish Protection Campaign

LET 'EM PASS!

Rock dams are harmful to fish and illegal

Due to this year's drought, many streams are lower than normal. Dams like the one below built of rocks are both illegal and harmful to salmon, bull trout, and other native fish that go upstream to lay their eggs.

To make sure fish survive for the future, we need your help. Please do not build dams or other structures within the stream. Report incidents of dam building to your local Washington State Patrol or Washington Fish and Wildlife office.



Rock dam on Box Canyon Creek that blocked adult bull trout migration in 2001

For more information on the effects of drought on fish and wildlife, see the Washington Department of Fish and Wildlife's drought website at:

<http://wdfw.wa.gov/drought/>



